

Peripheral Nerve Disorders

Asıl alt başlık stilini düzenlemek için tıklatın



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Peripheral Nervous System (PNS)

- PNS, consists of the nerves and ganglia **outside** of the **brain and spinal cord**
- The main function of the PNS is to **connect** the central nervous system to the limbs and organs
- The cranial nerves are part of the PNS with the exception of cranial

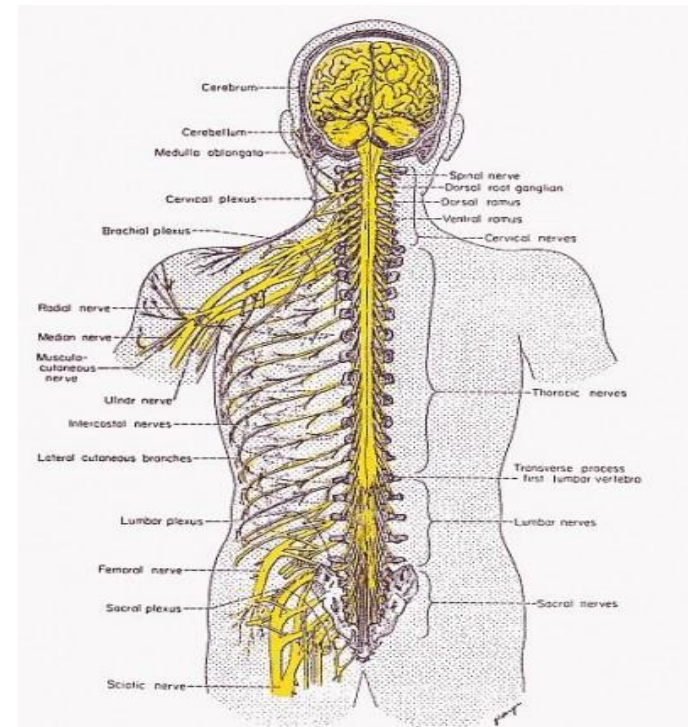
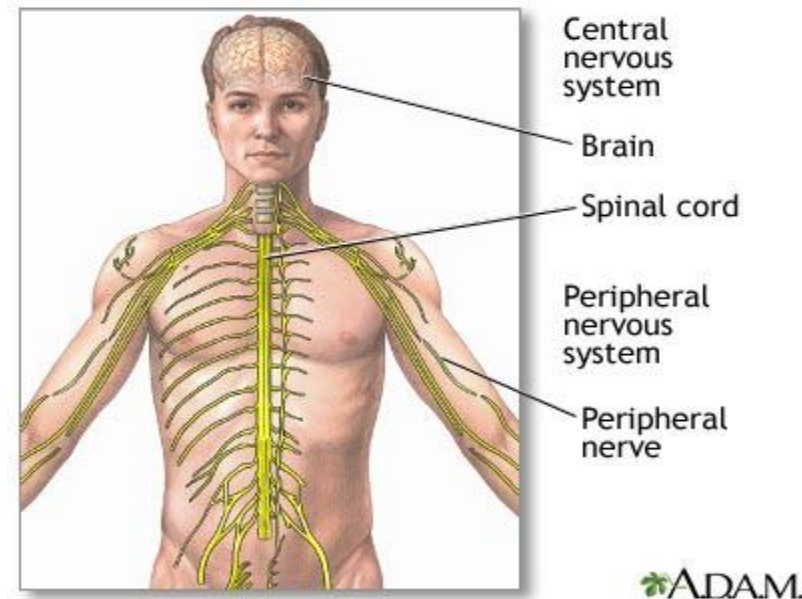
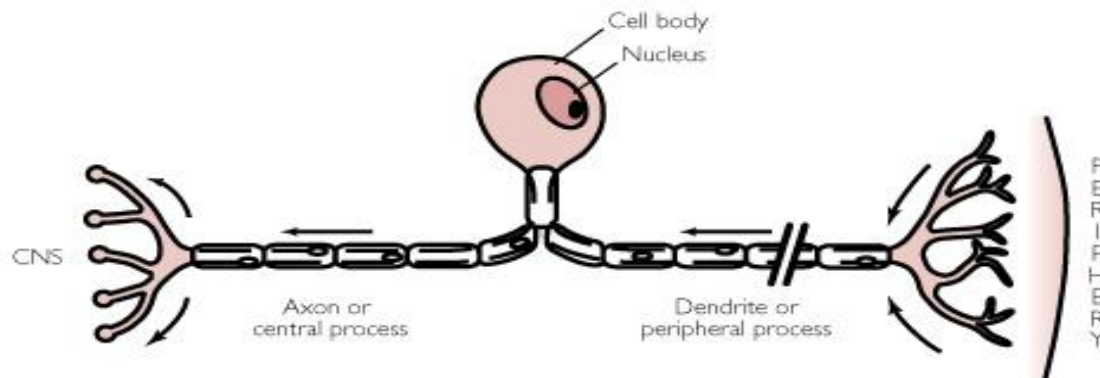
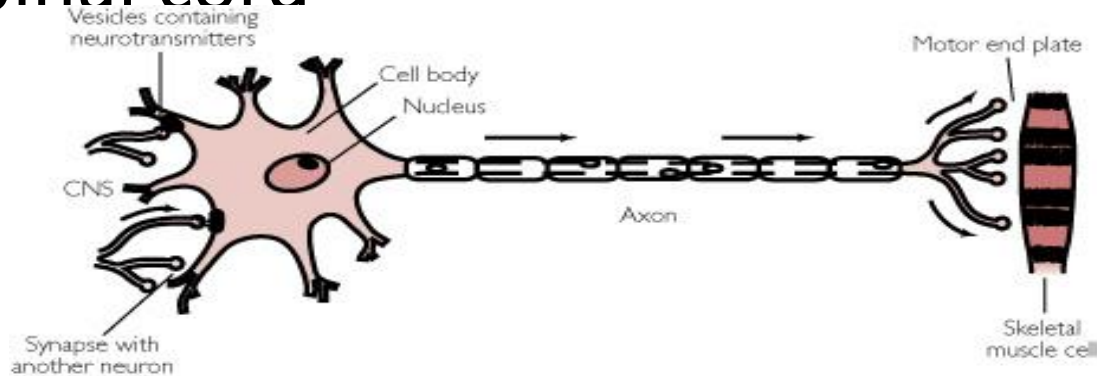


Fig. 2. The human central nervous system, exposed by dissection from the dorsal aspect. Shows the brain, spinal cord and the proximal parts of the spinal nerves.

Types of peripheral nerves

- **Motor nerves** –from spinal cord to skeletal muscles
- **Sensory nerves** –from sensory organs to spinal cord



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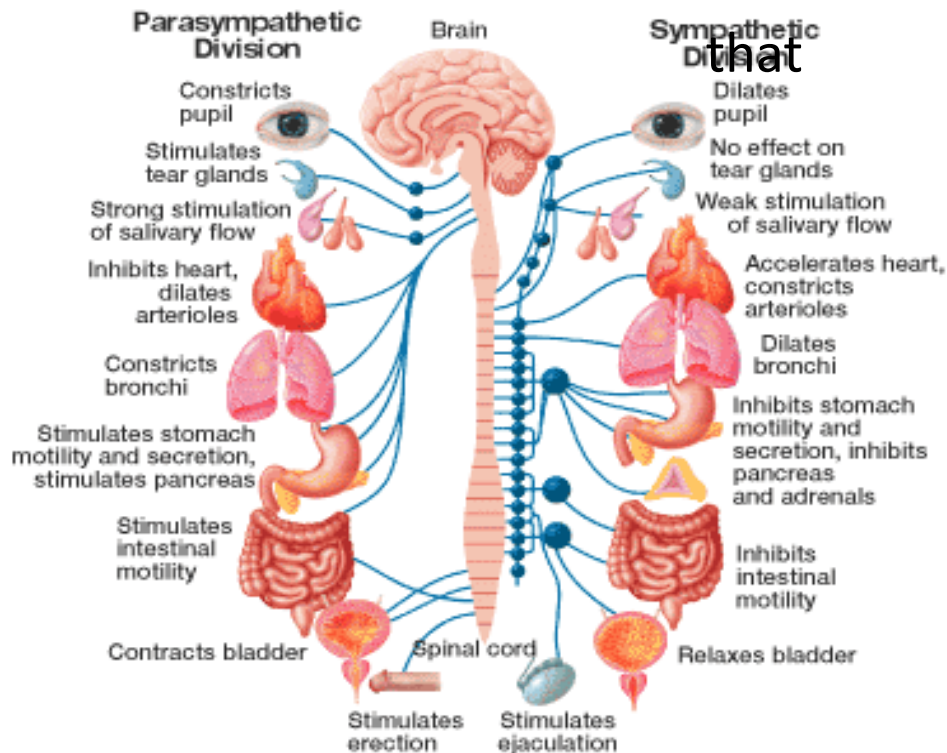
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Types of peripheral nerves

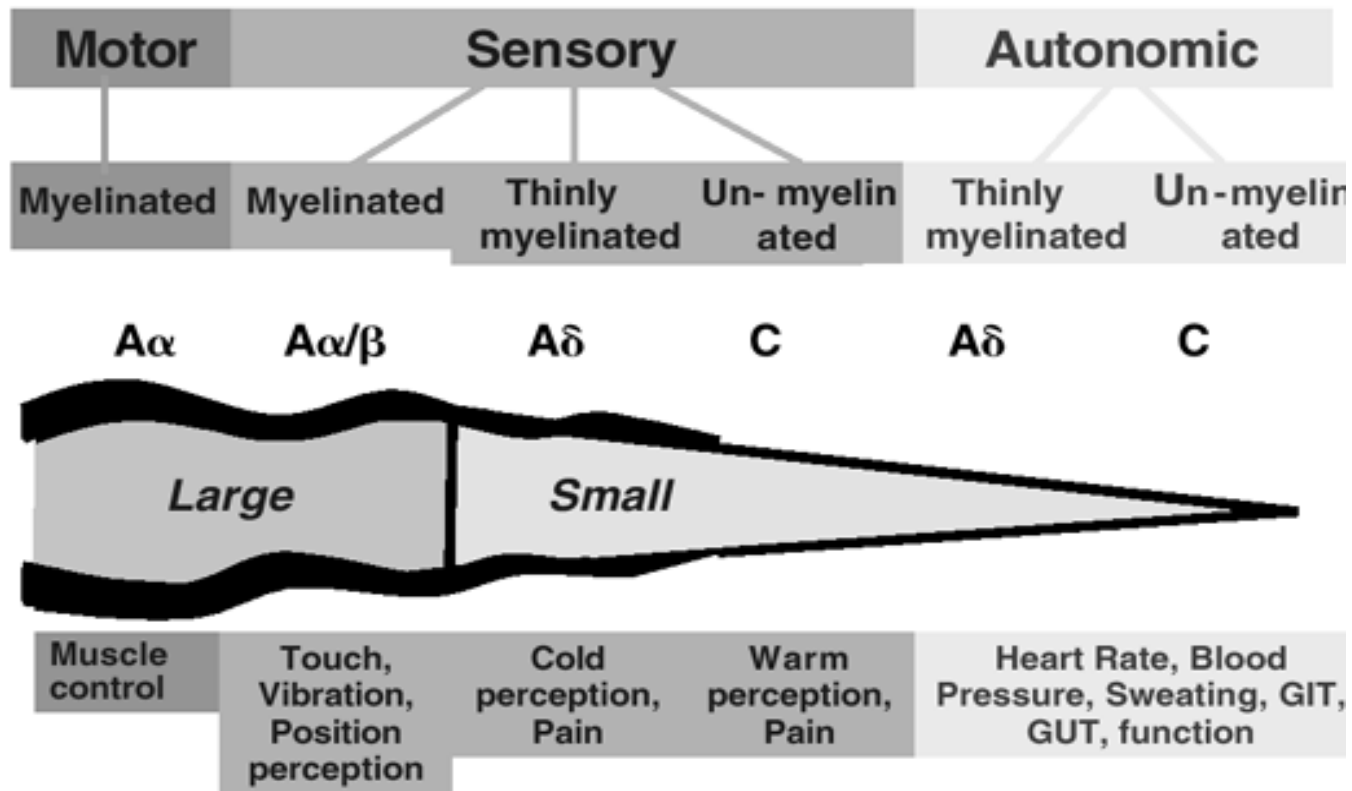
- **Autonomic nerves** –Controls involuntary muscles, such as smooth and cardiac muscle. control blood pressure, sweating, bladder function, heart rate, gut, etc. All the things you don't have to think about

- **Sympathetic** - controls activities that increase energy expenditures.

- **Parasympathetic** - controls activities that conserve energy expenditures.



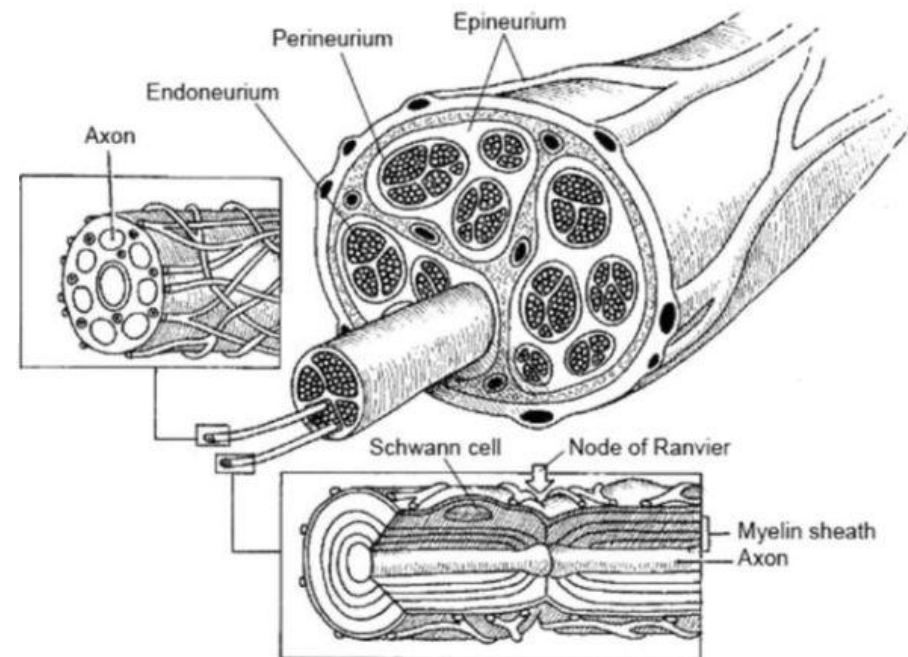
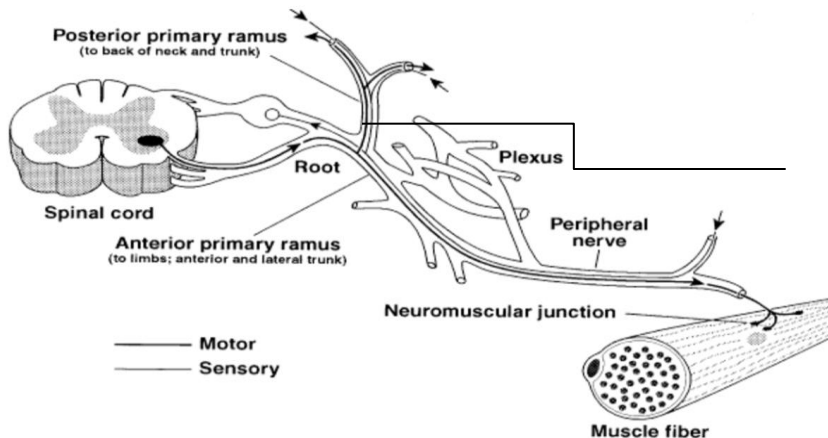
A Simplified View of The PNS



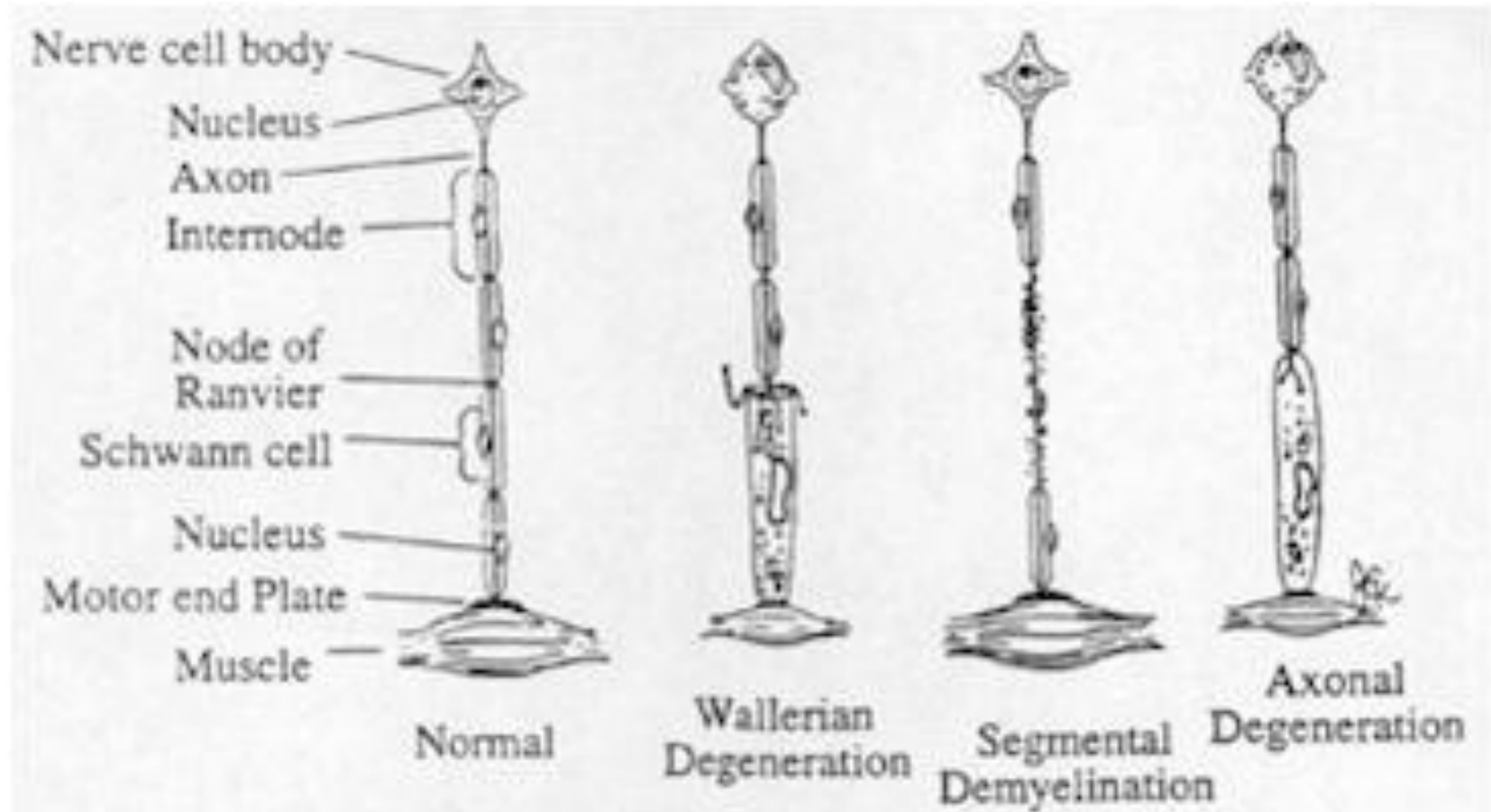
Peripheral Nerve Disorders

- Unlike the CNS, the PNS is not protected by the bone of spine and skull, or by the blood–brain barrier, leaving it exposed to toxins and mechanical injuries.

Disorders of the Peripheral Nervous System



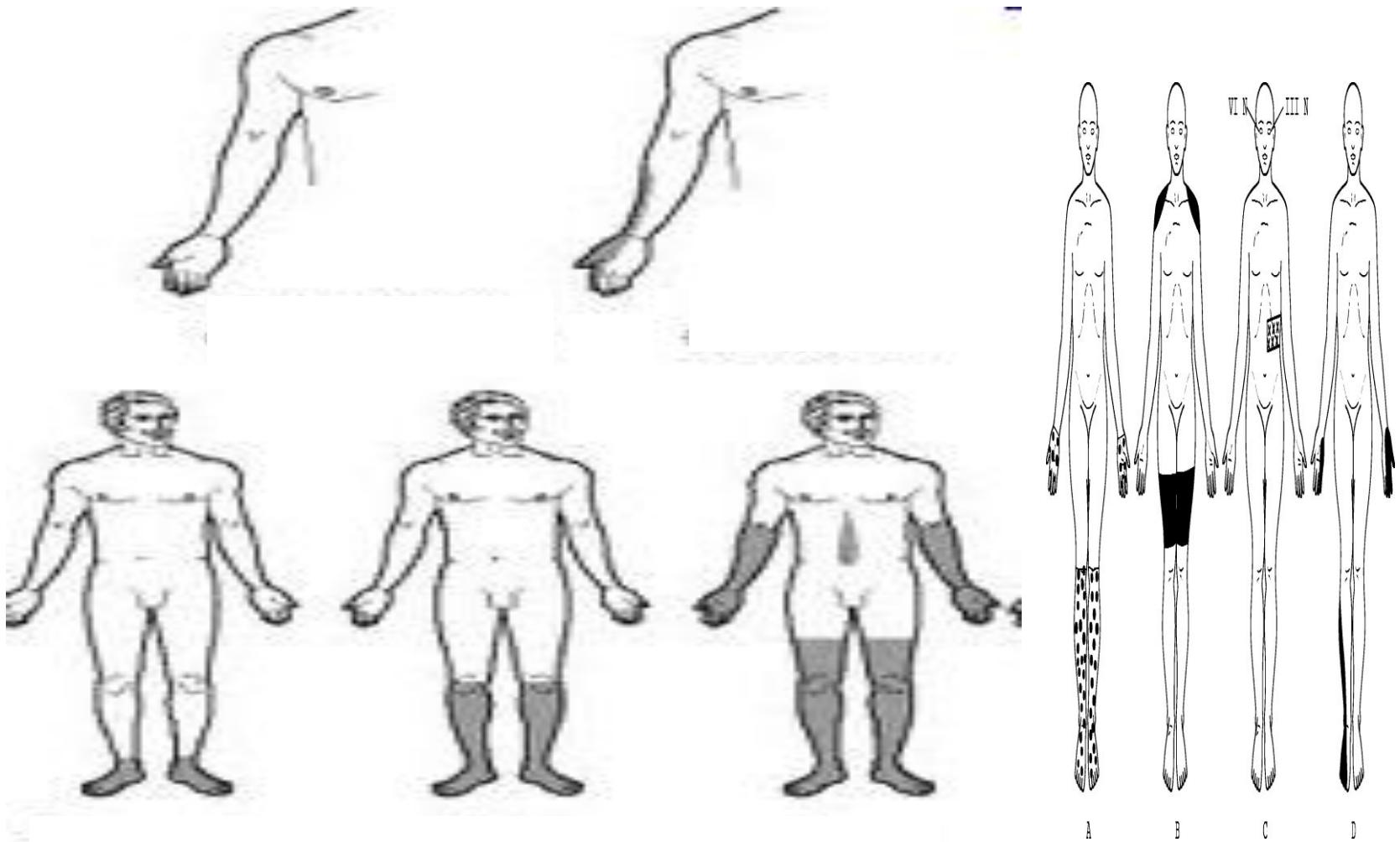
Types of Degenerations



Peripheral Neuropathy Distribution

- Any disease of the peripheral nerves of any cause
- ***Distribution*** type is important !
 - Polyneuropathy – distal symmetric distribution
 - Mononeuropathy Multiplex – multifocal random
 - Mononeuropathy – single nerve involvement

Distribution of peripheral neuropathy



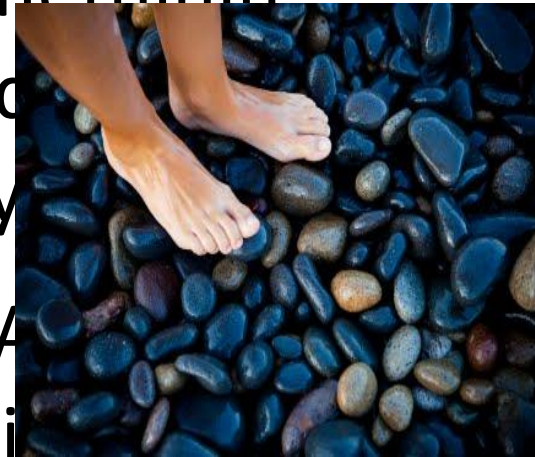
Peripheral Neuropathy

- Vary in:
 - ***Rate*** of disease evolution
(***acute/subacute/chronic***)
 - ***Axonal/demyelinating***/both
 - ***Motor/sensory/autonomic***/combination
 - ***Small fiber vs. large fiber*** involvement
 - Small fiber symptoms : pain and temperature disturbances (numbness, painful paresthesias)
 - Large fiber symptoms and signs : weakness, areflexia, sensory ataxia or loss of position and vibration sense

Peripheral Neuropathy

Symptoms

- Weakness
- Neuropathic Pain
 - Pain
 - Burning
 - Tingling, pins & needles
- Thick soles
- Walking on stones
- Imbalance
- Autonomic features
(hypotension, tachycardia, bradycardia, sweating)



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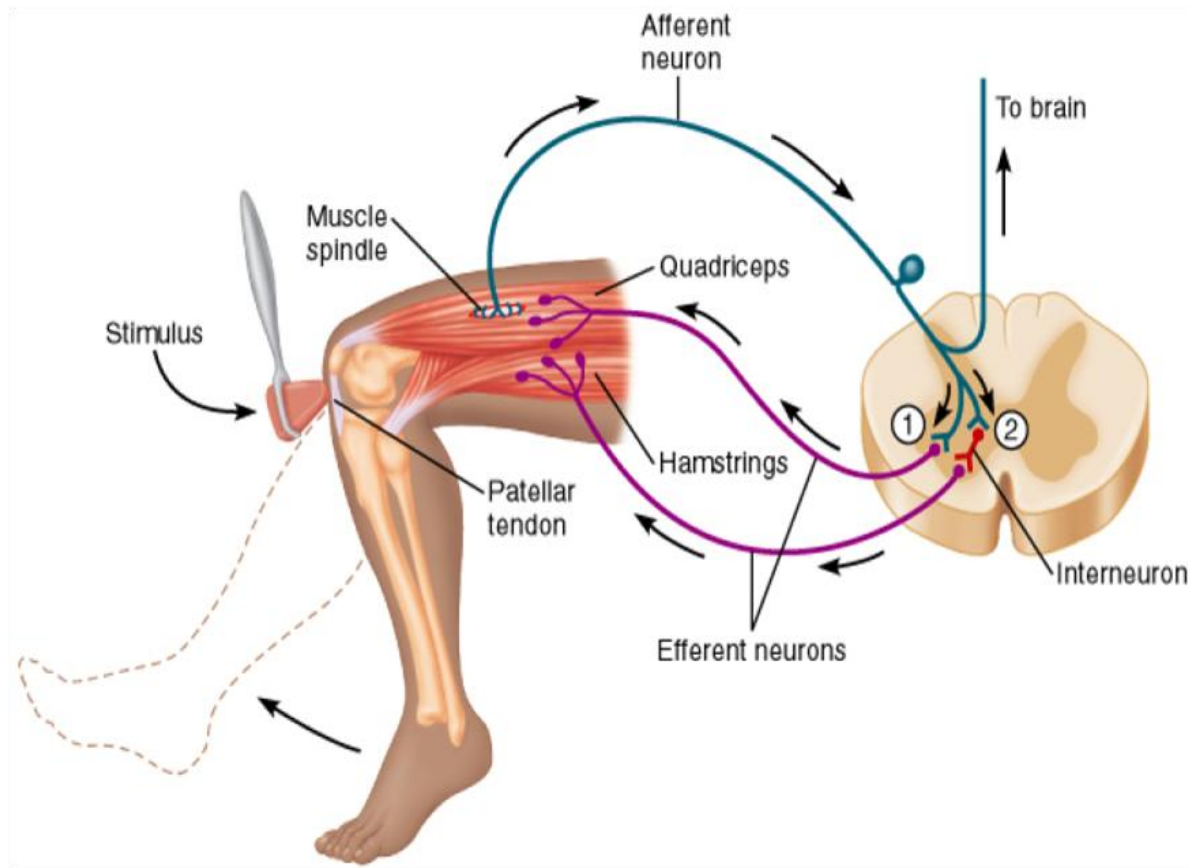
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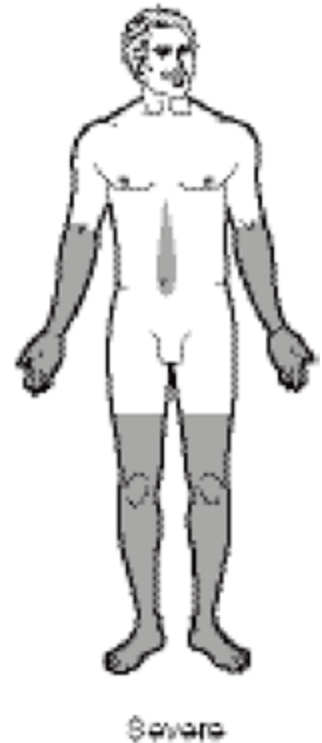
- Loss of DTR's
 - Dördüncü
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Causes of Neuropathy

- Inflammatory (blood vessels or myelin)
- Hereditary (Charcot Marie Tooth)
- Metabolic (diabetes, liver, kidney)
- Toxic (alcohol, chemical exposure)
- Vitamin deficiency (B12, D, Thiamine...)
- Drug related (chemo drugs)
- Related to tumor (paraneoplastic)

Polyneuropathy

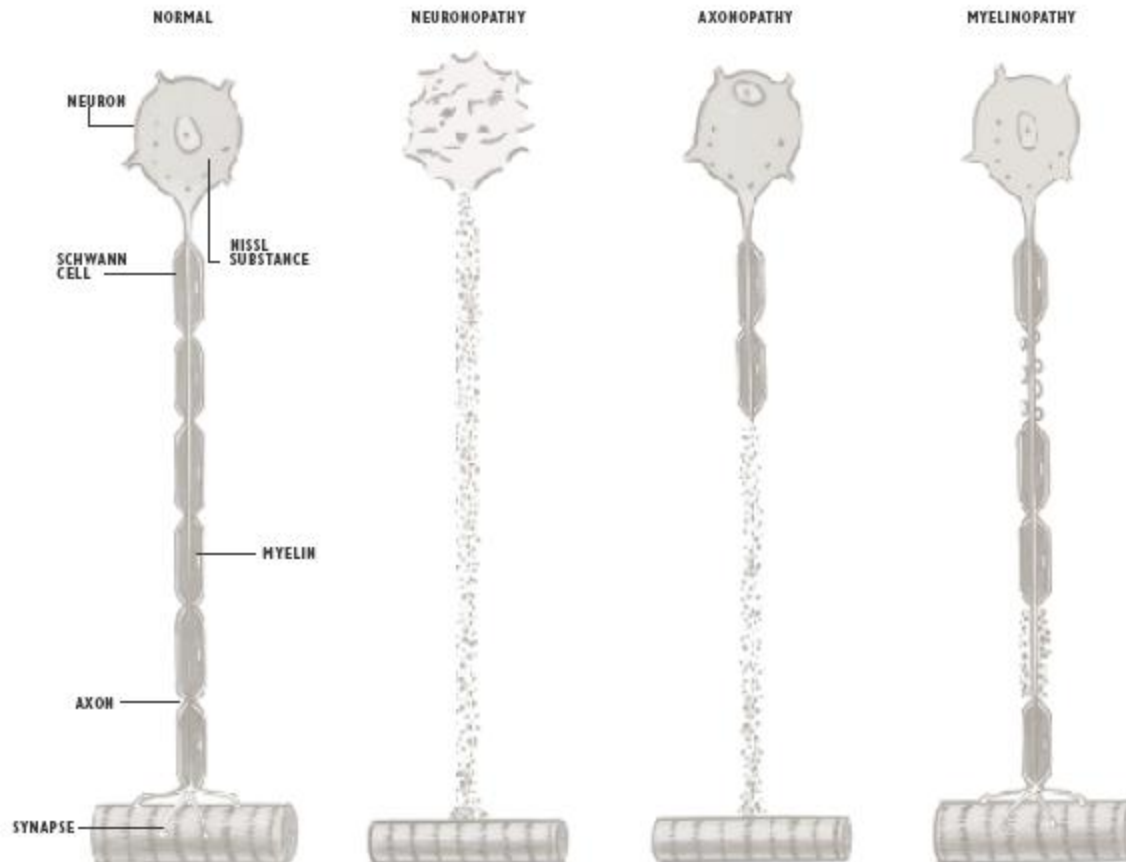
- Pathologic involvement of peripheral nerves usually due to acquired toxic and metabolic states
- Manifestations:
 - Distribution – ***distal symmetrical (glove-stocking distribution)***
 - First symptoms tend to be sensory loss or dysfunction (dysesthesias)
 - Signs and symptoms of lower motor neuron disease (decreased DTRs, atrophy,



Classification of polyneuropathy:

Axonal

- Generally, metabolic/toxic; ***diabetic***



Common Causes of Polyneuropathy

- ***Diabetes mellitus***
- Uremia
- Vit. B deficiency
- Critical illness
- Hypothyroidism
- Carcinomas
- HIV



Polyneuropathies

- **Diabetic Polyneuropathy**
 - Due to long standing hyperglycemia
 - Most common polyneuropathy
 - May take almost any form
 - ***Chronic, symmetric, distal , sensory, axonal***
 - Autonomic
 - Acute/subacute proximal
 - Cranial neuropathy
 - Truncal neuropathy
 - Entrapment neuropathies of the limb



Common Causes of polyneuropathy

• **Drugs**

- Antineoplastics
(cisplatin, vincristine)
- Amiodarone
- Dapsone
- Hydralazine
- Isoniazid
- Pyridoxine
- Phenytoin
- Metronidazole

• **Toxins**

Anahat metninin

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Arsenic

• İkinci Anahat Düzeyi
Diphtheria Toxin

– Üçüncü Anahat
Inorganic lead
Düzeyi

Organophosphates

• Dördüncü
Thallium Anahat Düzeyi

– Beşinci

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Classification of polyneuropathy :

Demyelinating

- Acute – **Guillain-Barre Syndrome (GBS)**
 - Precipitated by infection 1-3 weeks prior to onset of neuropathy
 - Immun attack to myelin/axon
 - Areflexic motor neuropathy with or without sensory problems
 - Acellular rise in the CSF protein (albuminocytologic dissociation)
 - 30% require ventilatory assistance at any point in the disease
 - 85% have complete recovery

Table 15.1. Selected Clinical Entities Associated with GBS

Infection	Collagen Vascular Diseases	Vaccination Related	Others
Nonspecific viral illness Cytomegalovirus Epstein-Barr virus	Systemic lupus erythematosus Wegener's granulomatosis Sarcoidosis	Influenza vaccination Oral polio vaccination Tetanus toxoid	Hodgkin's lymphoma Surgery, epidural anesthesia Medication and drugs: Captopril, thrombolytic agents, heroin Head trauma
HIV	Hashimoto's disease	Botulinum toxin therapy	Henoch-Schönlein purpura
Varicella			
Hemophilus influ. type B Mycoplasma Hepatitis A, B, C <i>Campylobacter</i> <i>Helicobacter jejuni</i>			

Table 15.2. Common Clinical Features of Typical GBS

Paresthesias	Initially "toes and fingers" then extremities "Charley horse" particularly in legs
Pain	Large muscle groups of arms and legs; muscle pain "crampy" Back pain may simulate sciatica
Weakness	Distal to proximal; variable Variable arm, facial, oropharyngeal Vital capacity – compromised
Autonomic symptoms	Bowel or bladder dysfunction Labile blood pressure, arrhythmias
Sensation	Variable; generally minimal loss

Variants of GBS

Axonal forms

Acute Motor-Sensory Axonal Neuropathy (AMSAN)

Acute Motor Axonal Neuropathy (AMAN)

Miller-Fisher Variant (Ophthalmoplegia, ataxia, areflexia)

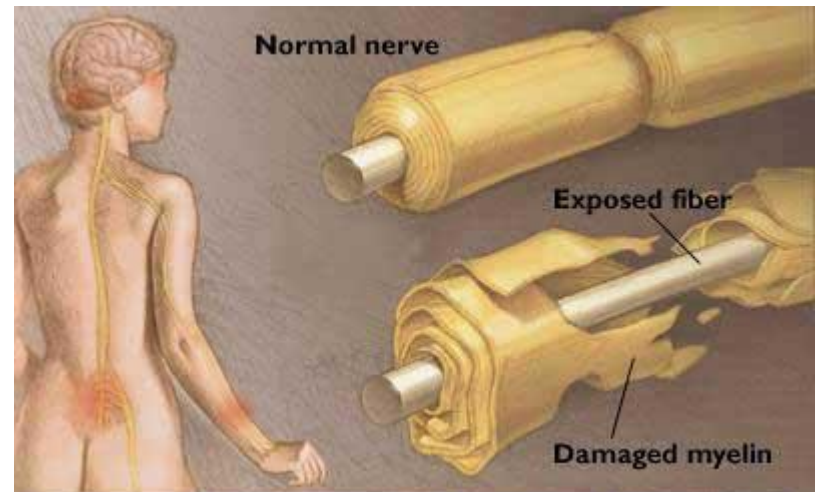
Pure Motor

Pure Sensory

Pure Autonomic

Polyneuropathies

- Acquired inflammatory demyelinating
 - Acute : GBS – monophasic
 - Chronic : CIDP – slowly progressive or relapsing
 - Treated with steroids, plasmapheresis and immunosuppressants



Classification of polyneuropathy :

Demyelinating

- Chronic
 - Inflammatory –CIDP (*Chronic inflammatory demyelinating polyneuropathy*)
 - Hereditary
 - Toxic
 - Metabolic



Polyneuropathies

- Hereditary Neuropathies
- Charcot–Marie–Tooth disease (CMT) / Hereditary motor sensory neuropathy (HSMN)



Polyneuropathies

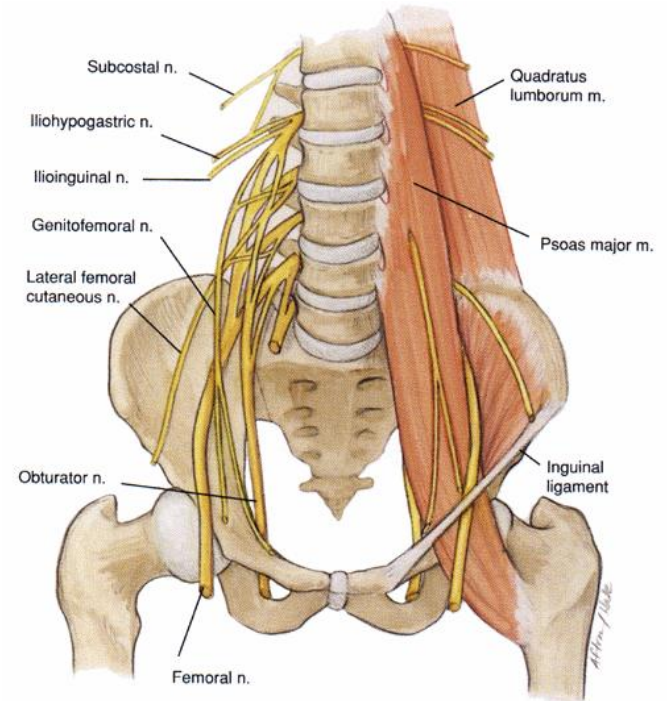
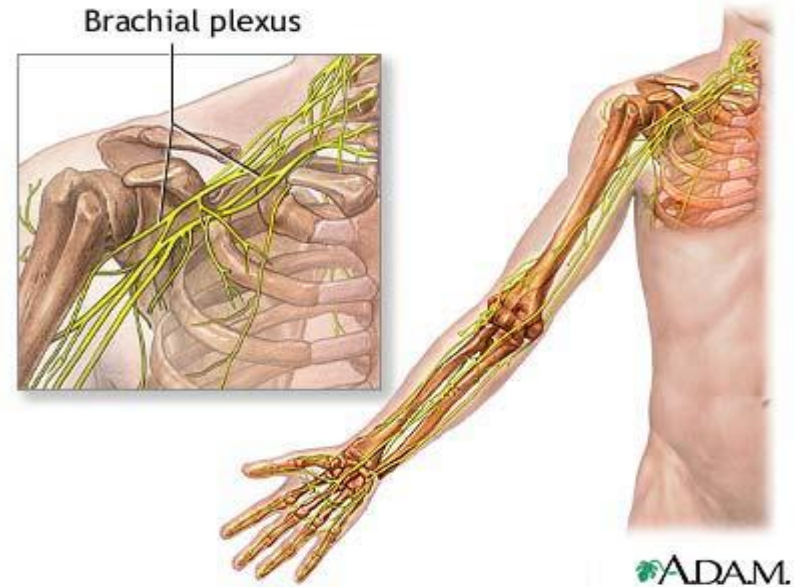
- Neuropathies of dysproteinemia
 - Multiple myeloma
 - Benign monoclonal gammopathy
- Neuropathies of HIV infection
 - Depends on the stage of the disease
 - GBS or CIDP- following seroconversion (asymptomatic)
 - Subacute to chronic mononeuritis multiplex (symptomatic)
 - Late symptomatic –distal symmetric sensory polyneuropathy or asymmetric painful polyradiculopathy involving the cauda equina caused by CMV

Polyneuropathies

- Autonomic neuropathies
 - Usually part of the more generalized polyneuropathy
 - Symptoms usually negative (postural hypotension, faintness, anhidrosis, hypothermia, bladder atony, obstipation, sexual impotence, dry eyes and mouth)
 - Positive symptoms include paroxysmal tachycardia, hypertension, diarrhea, hyperhidrosis

Peripheral Neuropathies

- Plexopathies
 - Causes:
 - Trauma
 - Cervical rib band
 - Malignant tumor infiltration
 - Radiation
 - Idiopathic



Plexopathies

- ***Upper brachial plexopathy:***
weakness, atrophy and pain in the shoulder girdle and arm
- ***Lower brachial plexopathy:***
weakness, atrophy and sensory loss or pain in the distal arm and hand
- ***Lumbosacral plexopathy***



Mononeuritis multiplex

- Simultaneous or sequential involvement of individual noncontiguous nerve trunks
- Multifocal and random
- Causes :
 - Vasculitis - 50% (PAN, SLE, RA, mixed CTD)
 - Infectious –leprosy
 - Granulomatous disease
 - Idiopathic

Mononeuropathy

- Trauma, compression, entrapment
- Upper Extremities:
 - **Ulnar Neuropathy** – most common site of compression is in its superficial site in the elbow, the medial cubital tunnel



Mononeuropathy

- **Radial Neuropathy**
 - most common site of compression is in the humeral groove (Saturday night palsy)
 - Wrist palsy



Path of
radial nerve



Mononeuropathy

- **Carpal tunnel syndrome** – **median nerve** entrapment secondary to excessive use of the wrist, local inflammation, arthritis, hypothyroidism, diabetes mellitus
 - Nocturnal paresthesia of the thumb, index and



Mononeuropathy

- Lower Extremities :
 - **Tarsal Tunnel syndrome**-distal tibial nerve entrapment in the posterior area of the medial malleolus secondary to sprains, fractures of the ankle, ill-fitting footwear, posttraumatic fibrosis, cysts, arthritis



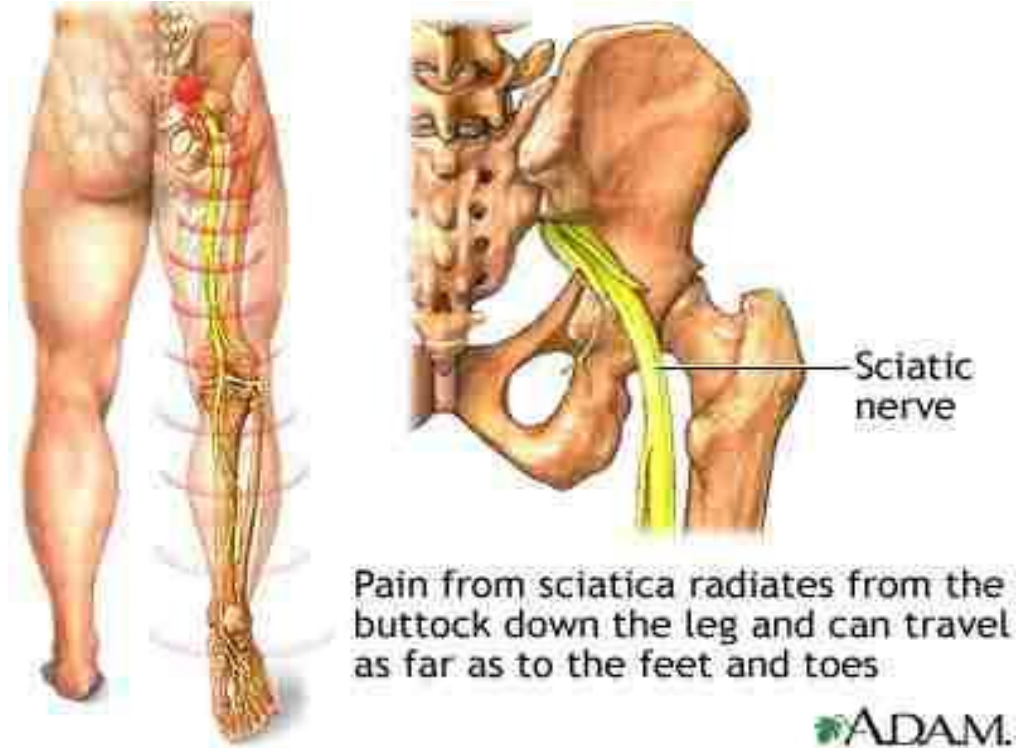
Mononeuropathy

- Lateral femoral cutaneous branch – meralgia paresthetica
 - Pain and dysesthesia over lateral thigh



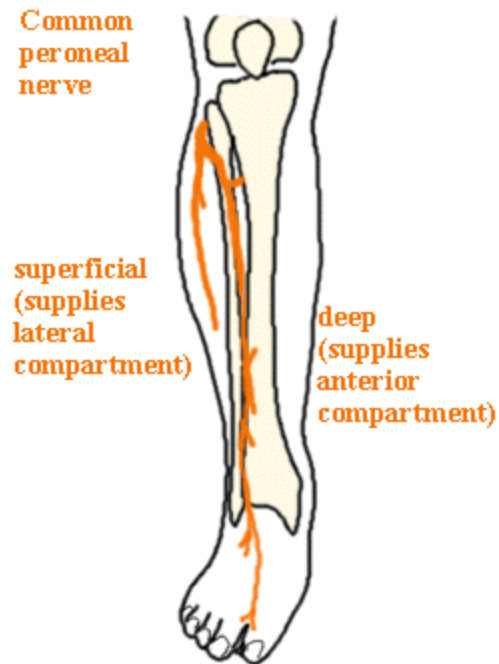
Mononeuropathy

- **Sciatic Nerve** –
near the sciatic
notch in the
gluteal region
 - Trauma, injection
 - Severe lower leg
and hamstring
pain and
weakness



Mononeuropathy

- **Peroneal nerve** compression
 - At the head of the fibula
 - Foot drop



Diagnosis

- History and physical exam
 - Weakness? Proximal or distal?
 - Sensory loss? Small fiber or large fiber
 - Autonomic symptoms? Sweat? BP? bladder?
- EMG/NCS
- Lab tests: CBC, liver, kidney, electrolytes, ESR, thyroid, inflammatory markers, protein study, Vit D, B12, 2 hour diabetes test
- Nerve /muscle biopsy (hereditary disorders)

Treatment

- Try to find cause of neuropathy and reverse it
- Treat symptoms

Treatment of symptoms

- Tricyclic antidepressants and SNRI's
 - Nortriptyline, Amitriptyline, Cymbalta, Effexor
- Anti-seizure medications
 - Gabapentin, Lyrica, Topamax,
- Topical agents-lidocaine patch, creams, capsaicin
- Narcotics
- NSAID's

Vitamins

- If you are B12 deficient taking B12 helps
- B6 (pyridoxime) can cause neuropathy, don't take more than 200mg per day

Treatment of Symptoms

- Stuff:
 - Good shoes
 - Practice balance
 - Rub feet
 - Watch weight

Recovery

- Depends on the ***nature*** of neuropathy (axonal vs demyelinating)
- Depends on whether the ***cause*** of the neuropathy has been eliminated